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Scientists Conduct Shark Survey off U.S. East Coast

More than 1,300 tagged and released to understand shark biology

Sandbar, dusky and tiger sharks are among dozens of shark species living in the coastal waters off the U.S. East Coast. Little is known about many of the species, but a series of ongoing surveys begun nearly 25 years ago is helping scientists and fishery resource managers to monitor shark populations and their role in marine ecosystems.

NOAA scientists from the Northeast Fisheries Science Center (NEFSC) lab in Narragansett, R.I., recently conducted their ninth coastal shark survey from Florida to Delaware. The survey, conducted every two to three years, is the longest independent survey of large coastal sharks in the U.S. Atlantic Ocean.

Using commercial Florida-style longline fishing methods to standardize results from survey to survey, researchers caught 1,675 sharks from 19 different species and tagged 1,352 of the animals during the 2009 survey in April and May. Most of the animals caught and tagged were sandbar sharks, a common species in the western Atlantic. Longline fishing is a type of fishing that uses a long or main line with baited hooks spaced out at certain intervals along the line.

"During the survey, we often catch 19 or more species, many of which are highly migratory, and we still have a lot to learn about them," said Nancy Kohler, who heads the Apex Predators Program at the Narragansett Lab and has been on every survey. "We do not know how large certain species are when they mature, for example. It is important that we obtain basic biological information from the fish we catch so that we can learn as much as possible about their life histories, or the changes that the animals undergo from birth to death."

Researchers record the length, sex and location of each animal caught before the fish is tagged and released. The sharks can range in size from one foot to 15 feet, but they are not weighed. Any dead fish are carefully dissected at sea, with researchers looking for parasites, collecting DNA and blood samples, and obtaining samples for studies of age and growth, reproductive biology and food habits.

The first systematic survey of Atlantic sharks was conducted by the Apex Predators Program in 1986 between Florida and southern New England waters from five to 200 meters deep (about 16 to 660 feet). Researchers gathered basic information such

as shark abundance and distribution, migration patterns, age and growth, reproductive biology, and feeding ecology.

Kohler said the survey is conducted in the spring because coastal shark species distributions are concentrated during this time of year since the waters north of Delaware are too cold, thus making it easier to survey the whole population. Nearly all of the surveys have been conducted from the NOAA ship *Delaware II*, based at the NEFSC's Woods Hole Laboratory.

"We caught more fish and tagged more fish on this survey than any other," said Lisa Natanson, who heads the coastal survey effort and has been on all but one of the surveys. "The previous high total was in 1998, when we caught 917 sharks and tagged 859." In addition to numerous sandbar sharks, the researchers also caught one great white, many tiger and dusky sharks, and some Atlantic sharpnose. The current data is part of just one of several long-term data sets that are used to determine the health of shark populations.

The survey takes six weeks to complete and is divided into three legs or phases, each approximately two weeks long. Eight scientists are on board for each phase, and fishing is conducted around the clock. Environmental information, such as water temperature and ocean chemistry, is obtained at each station.

Survey data are provided to fishery managers who monitor populations in the Atlantic and Gulf of Mexico. The NOAA's Fisheries Service manages the commercial and recreational shark fisheries in U.S. waters, including the Caribbean Sea and the Gulf of Mexico. The United States began regulating shark fisheries in 1993 and currently manages 39 species. A fishery management plan that includes sharks, swordfish, and tunas was enacted in 1999, regulating sharks under a catch limit and quota system.

In addition to the coastal shark survey, Kohler, Natanson and colleagues in the Apex Predators Program work with thousands of volunteers throughout the Atlantic Ocean, Gulf of Mexico and the Mediterranean Sea through the Cooperative Shark Tagging Program. The lab also manages and coordinates the Cooperative Atlantic States Pupping and Nursery Survey, collaborating with researchers in coastal states from Rhode Island to Florida to conduct a comprehensive and standardized investigation of shark nursery areas.

Scientists in the program conduct life history studies of commercially and recreationally important shark species, participate in and conduct a variety of research cruises, and often go aboard commercial vessels to obtain biological samples from the catch as well as to tag sharks. Biological samples are also collected from recreational fishing tournaments in the northeast U.S.

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Related links:

Apex Predators Program: <http://na.nefsc.noaa.gov/sharks/index.html>

Highly Migratory Species: <http://www.nmfs.noaa.gov/sfa/hms/index.htm>